

EXHIBIT 2

1 IN THE UNITED STATES DISTRICT COURT
2 FOR THE NORTHERN DISTRICT OF OHIO
3 EASTERN DIVISION
4 - - -

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7 LITIGATION :
8 This document relates to: : NO.
9 County of Cuyahoga, et : 1:17-MD-2804
10 al. v. Purdue Pharma L.P., :
11 et al., Case No. 17-OP- :
12 45004 (N.D. Ohio) :
13 County of Summit, Ohio et :
14 al. v. Purdue Pharma L.P., :
15 et al., Case No. 18-OP- :
16 45090 (N.D. Ohio) :
17 - - -

18 - HIGHLY CONFIDENTIAL -
19 SUBJECT TO FURTHER CONFIDENTIALITY REVIEW
20 April 25, 2019

21 Videotaped deposition of
22 JONATHAN GRUBER, Ph.D., taken pursuant to
23 notice, was held at the law offices of
24 Robins Kaplan, 800 Boylston Street,
Boston, Massachusetts, beginning at 10:06
a.m., on the above date, before Michelle
L. Gray, a Registered Professional
Reporter, Certified Shorthand Reporter,
Certified Realtime Reporter, and Notary
Public.

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I N D E X
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Testimony of: JONATHAN GRUBER, Ph.D.

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6

7	By Mr. Geise	15
8	By Mr. Haller	390, 486
9	By Ms. Rumsey	459
10	By Ms. Unger Davis	444
11	By Mr. Ko	470

12

13

- - -
E X H I B I T S
- - -

14

15

16

17 NO.	DESCRIPTION	PAGE
18 Gruber-1	Expert Report of Professor Jonathan Gruber, 3/25/19	19
20 Gruber-2	Pain Management And Opioid Epidemic Balancing societal And Individual Benefits and Risks of Prescription Opioid Use	92

21

22

23

24

1		- - -	
2	E X H I B I T S (Cont'd.)		
3		- - -	
4			
5	NO.	DESCRIPTION	PAGE
6	Gruber-3	Public Finance And Public Policy Fifth Edition	100
7			
8	Gruber-4	How Increasing Medical Access to Opioids Contributes To the Opioid Epidemic (Powell)	214
9			
10	Gruber-5	Relationship Between Nonmedical Prescription Opioid Use and Heroin Use (Compton)	252
11			
12	Gruber-6	HHS Public Access US Regional and Demographic Differences in Prescription Opioid And Heroin-Related Overdose Hospitalizations (Unick)	269
13			
14			
15			
16			
17			
18	Gruber-7	Increased Use Of Heroin as an Initiating Opioid Of Abuse (Cicero)	272
19			
20			
21			
22			
23			
24			

1		- - -
2	E X H I B I T S	(Cont'd.)
3		- - -
4		
5	NO.	DESCRIPTION
6	Gruber-8	Nonmedical Prescription Opioids And Pathways of Drug Involvement in the US Generational Differences (Wall)
7		
8	Gruber-9	Heroin Use and Heroin Use Risk Behaviors Among Nonmedical Users of Prescription Period Pain Relievers (Jones)
9		
10	Gruber-10	Associations of Nonmedical Pain Relievers Use and Initiation of Heroin Use in the United States (Muhuri)
11		
12		
13		
14		
15		
16		
17	Gruber-11	The Changing Face of Heroin Use in the United States: A Retrospective Analysis of the Past 50 Years (Cicero)
18		
19		
20		
21		
22		
23		
24		

1		- - -	
2		E X H I B I T S	(Cont'd.)
3		- - -	
4			
5	NO.	DESCRIPTION	PAGE
6	Gruber-12	Injection and Sexual HIV/HCV Risk Behaviors Associated With Nonmedical Use Of Prescription Opioids (Mateu-Gelabert)	318
7			
8			
9			
10	Gruber-13	Abuse-Deterrent Formulations and the Prescription Opioid Abuse Epidemic in the US: Lessons Learned From OxyContin (Cicero)	324
11			
12			
13			
14	Gruber-14	How the Reformulation of OxyContin Ignited The Heroin Epidemic (Evans)	346
15			
16			
17	Gruber-15	Supply-Side Drug Policy in the Presence of Substitutes Evidence from the Introduction of Abuse-Deterrent Opioids (Alpert)	372
18			
19			
20			
21	Gruber-16	A Transitioning Epidemic: How the Opioid Crisis is Driving The Rise In Hepatitis C (Powell)	382
22			
23			
24			

1

- - -

2

E X H I B I T S (Cont'd.)

3

- - -

4

5	NO.	DESCRIPTION	PAGE
6	Gruber-17	Letter, 12/16/13 To Dr. Hamburg	455
7	Gruber-18	Changing Dynamics of the Drug Overdose Epidemic in the United States from 1979 Through 2016 (Jalal)	460

11

12

13

14

15

16

17

18

19

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21

22

23

24

1

- - -

2

DEPOSITION SUPPORT INDEX

- - -

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5 Direction to Witness Not to Answer

6 PAGE LINE

None.

7

8 Request for Production of Documents

9 PAGE LINE

None.

10

11 Stipulations

12 PAGE LINE

None.

13

14 Questions Marked

15 PAGE LINE

None.

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1 the term "defendants." Can you define
2 how you use that term?

3 A. I use that term in my
4 understanding to refer to the set of
5 entities that are being -- that are
6 defendants in this litigation.

7 Q. Can you identify the set of
8 entities that are being sued in this
9 litigation?

10 A. Not completely, no.

11 Q. How many of the entities
12 that have been sued in this litigation
13 can you name?

14 A. It depends how long you want
15 to give me. But I can certainly name a
16 number of them.

17 Q. Now, your recitation of the
18 two economic questions that arose, that
19 you address in your report, it does not
20 include an evaluation to the extent which
21 the actions of a specific entity who has
22 been sued in this case contribute to what
23 you call an epidemic, correct?

24 MR. KO: Object to the form.

1 THE WITNESS: That's
2 correct.

3 BY MR. GEISE:

4 Q. Similarly, your recitation
5 doesn't include an estimate of damages
6 that result from a specific entity's
7 actions, correct?

8 A. The report includes the
9 damages that result from the collective
10 set of actions of the defendants.

11 Q. And when you speak of the
12 collective set of actions, you have not
13 done anything to parcel out damages
14 attributable to a specific defendant,
15 correct?

16 A. Correct.

17 Q. Neither as a contributor to
18 the epidemic as you call it, correct?

19 MR. KO: Object to the form.

20 THE WITNESS: Correct.

21 BY MR. GEISE:

22 Q. And -- and not as to the
23 question of damages, correct?

24 A. Correct.

1 Q. Is it accurate to say that
2 you do not intend to offer an opinion in
3 this case regarding a specific defendant?

4 A. Yes, that's accurate.

5 Q. Turning to Page 8 of your
6 report in Paragraph 15. You set out what
7 you've been asked by counsel for the
8 bellwether plaintiffs to specifically
9 address.

10 Do you see that?

11 A. Yes, I do.

12 Q. First it says you've been
13 asked to provide, from the perspective of
14 accepted principles of economics, an
15 overview of the nation's opioid crisis.

16 Do you see that?

17 A. Yes, I do.

18 Q. Does that reflect your
19 understanding of that part of your
20 assignment?

21 A. Yes, it does.

22 Q. In connection with that
23 section of your report are you providing
24 those opinions to a reasonable degree of

1 certainty in the field of economics?

2 A. That -- yes. I'm an
3 economist. So that's what I'm doing.

4 Q. Look at the second part of
5 Paragraph 15. You write, "Second, I have
6 been asked whether, to a reasonable
7 degree of certainty in the field of
8 economics, the defendants' shipments of
9 prescription opioids contributed in whole
10 or part to the growth in the misuse of
11 opioids and the increases in licit and
12 illicit opioid-related mortality over the
13 past 20 years and to explain the bases
14 for my opinion."

15 Do you see that?

16 A. Yes.

17 Q. And does that accurately
18 reflect your understanding of that part
19 of your assignment?

20 A. Yes, it does.

21 Q. Professor Gruber, was
22 your -- were you requested to form an
23 opinion regarding shipments to Cuyahoga
24 County and Summit County in particular?

1 A. I don't quite understand the
2 question.

3 Q. Sure. So you indicate that
4 you were asked whether shipments of
5 prescription opioids contributed to the
6 growth and the misuse of opioids and
7 increases in licit and illicit
8 opioid-related mortality, right?

9 A. Right.

10 Q. Were you asked to focus
11 specifically on Cuyahoga and Summit
12 County for purposes of that question?

13 A. I was asked to focus
14 specifically on them in terms of
15 documenting the, as you'll see in the
16 report, the underlying change in both
17 shipments in harms in Cuyahoga and Summit
18 as well as nationally.

19 Q. When you say as well as
20 nationally, are Cuyahoga and Summit part
21 of the national picture?

22 A. Yes.

23 Q. And as part of your
24 analysis, did you look at the national

1 picture and then apply that to Cuyahoga
2 and Summit?

3 MR. KO: Object to the form.

4 THE WITNESS: I looked at
5 the national picture and
6 separately the Cuyahoga and Summit
7 situation.

8 BY MR. GEISE:

9 Q. Have you made any effort to
10 determine the specific shipments of
11 prescription opioids from any particular
12 defendant in this case?

13 MR. KO: Object to the form.

14 THE WITNESS: No, I have
15 not.

16 BY MR. GEISE:

17 Q. Have you made any effort to
18 determine a specific defendants'
19 shipments of opioids to Cuyahoga or
20 Summit County?

21 MR. KO: Object to the form.

22 THE WITNESS: No, I have
23 not.

24 BY MR. GEISE:

1 Q. As you mentioned before,
2 does your analysis only consider the
3 impact of aggregate opioid shipments?

4 MR. KO: Objection.

5 THE WITNESS: As laid out in
6 the report, we define both
7 aggregate opioid shipments, and in
8 some places we parse out different
9 types of opioids. So -- but
10 that's the finest detail we go
11 into.

12 BY MR. GEISE:

13 Q. You don't go into a detail
14 with respect to a particular defendants'
15 shipment of opioids, correct?

16 A. Correct.

17 Q. And if I wanted to ask you
18 today about if you had any opinions about
19 any specific defendant with regard to
20 their shipments, you're not prepared to
21 address that?

22 A. I'm not, no.

23 Q. You agree that prescription
24 opioids come in many different forms,

1 correct?

2 A. Yes.

3 Q. And you agree that different
4 pharmaceutical manufacturers make
5 different prescription opioids?

6 A. Yes.

7 Q. Your analysis did not
8 differentiate between different
9 pharmaceutical manufacturers, correct?

10 MR. KO: Objection.

11 THE WITNESS: That's
12 correct.

13 BY MR. GEISE:

14 Q. And you didn't -- did you do
15 anything to limit your analysis to
16 shipments by pharmaceutical manufacturers
17 who are defendants in this lawsuit?

18 A. I'll just need one minute to
19 check the appendix.

20 No, I didn't.

21 Q. Similarly, did you do
22 anything to limit your analysis to
23 shipments by distributors who are
24 defendants in this lawsuit?

1 A. No, I didn't.

2 Q. With respect to the entities
3 who are defendants in this lawsuit,
4 you're not saying that each defendant is
5 jointly and severally liable for the
6 damages to the bellwether government
7 entities, are you?

8 MR. KO: Object to the form.

9 THE WITNESS: I'm not really
10 speaking to that issue.

11 BY MR. GEISE:

12 Q. You don't have an opinion on
13 that, correct?

14 MR. KO: Same objection.

15 THE WITNESS: I'm an
16 economist. That's a legal
17 question.

18 BY MR. GEISE:

19 Q. If I can turn your attention
20 to Paragraph 16 of your report that spans
21 from Page 8 to Page 10. Look at the
22 first bullet point on Paragraph 16. You
23 write, "There is a direct causal
24 relationship between defendants'

1 shipments of prescription opioids and the
2 misuse and mortality from prescription
3 opioids with geographic areas that
4 received higher volumes of per capita
5 shipments of prescription opioids
6 experiencing significantly higher rates
7 of opioid-related misuse and mortality,
8 including the bellwether jurisdictions."

10 A. Yes, I do.

11 Q. As stated in this paragraph,
12 does prescription opioids include
13 prescription opioids that are used both
14 for medical purposes and those that are
15 not used for medical purposes?

16 MR. KO: Object to the form.

22 BY MR GETSE:

23 Q. If you look at the next
24 bullet point on the top of Page 9, you

1 write, "There is a direct causal
2 relationship between defendants'
3 shipments of prescription opioids and the
4 misuse of and mortality from illicit
5 opioids, including heroin and fentanyl,
6 which accelerated rapidly after 2010."

7 Do you see that?

8 A. Yes, I do.

9 Q. When you used the term
10 "illicit opioids" here, are you excluding
11 the nonmedical use of prescription
12 opioids in that definition?

13 MR. KO: Object to the form.

14 THE WITNESS: Yes, I am.

15 BY MR. GEISE:

16 Q. And again, with respect to
17 both of these bullet points in Paragraph
18 16 of your report, you've done nothing to
19 establish a direct causal relationship
20 between a specific defendant's shipment
21 of prescription opioids and the harm that
22 you say follows, correct?

23 A. That's correct.

24 Q. Look at the next sentence in

1 that top bullet point on Paragraph 9 of
2 your expert report. You write, "As has
3 been widely recognized in the economic
4 literature, the growth in the dependence
5 on prescription opioids from the early
6 1990s to 2010, coupled with a variety of
7 factors starting in and around 2010,
8 created an increased demand for illicit
9 opioids, including heroin and later
10 fentanyl.

11 "These factors included the
12 release of an abuse-deterrent formulation
13 of OxyContin, the increase in state level
14 prescription drug monitoring programs,
15 caps on opioid prescribing, and law
16 enforcement investigation and
17 prosecutions against pill mills
18 throughout the country."

19 Do you see that?

20 A. Yes, I do.

21 Q. Professor Gruber, is it your
22 opinion that the release of an
23 abuse-deterrent formulation of OxyContin
24 caused an increased demand for illicit

¹ opioids, including heroin and fentanyl?

2 MR. KO: Object to the form.

3 THE WITNESS: Yes, it is.

4 BY MR. GEISE:

5 Q. Is it your opinion that the
6 increase in state level prescription drug
7 monitoring programs caused an increased
8 demand for illicit opioids including
9 heroin and fentanyl?

10 MR. KO: Same objection.

11 THE WITNESS: Yes, it is.

12 BY MR. GEISE:

13 Q. Is it your opinion that caps
14 on opioid prescribing cause an increased
15 demand for illicit opioids, including
16 heroin and fentanyl?

17 MR. KO: Same objection.

18 THE WITNESS: Yes, it is.

19 BY MR. GEISE:

20 Q. And is it your opinion that
21 law enforcement investigations and
22 prosecutions caused an increased demand
23 for illicit opioids, including heroin and
24 fentanyl?

1 MR. KO: Same objection.

2 THE WITNESS: Yes, it is.

3 BY MR. GEISE:

4 Q. Professor Gruber, have you
5 apportioned how each of those causal
6 factors contributed to illicit opioid
7 use?

8 A. No, I have not.

9 Q. And the list that you
10 provide of factors in that second bullet
11 point on paragraph -- in Paragraph 16 of
12 your report, that's not an exhaustive
13 list of factors that contribute to an
14 increased demand for illicit opioids, is
15 it?

16 A. No.

17 Q. Other factors could include
18 the ease of accessibility to illicit
19 opioids, correct?

20 MR. KO: Object to the form.

21 THE WITNESS: That's
22 correct.

23 BY MR. GEISE:

24 Q. Internet availability for

1 Q. Professor Gruber, I'm
2 handing you an excerpt from the book
3 Public Finance and Public Policy that you
4 might recognize since you wrote it.

5 Do you see that?

6 A. Yes, I do.

7 Q. And this is not the entire
8 book. This is just an excerpt. I want
9 to ask you about some specific passages
10 in your book. First, if I can turn your
11 attention to Page 66.

12 MR. KO: This is Exhibit 3?

13 MR. GEISE: It is Exhibit 3.

14 Yes.

15 THE WITNESS: Okay.

16 BY MR. GEISE:

17 Q. At the top of Page 66, you
18 write, "In this chapter, we review these
19 empirical methods and encounter the
20 fundamental issue faced by those doing
21 empirical work in economics,
22 disentangling causality from
23 correlation."

24 Do you see that?

1 A. Yes, I do.

2 Q. And is it your opinion that
3 this is a fundamental issue faced by
4 those doing empirical work in economics?

5 A. Yes, it is.

6 Q. That paragraph continues,
7 "We say that two economic variables are
8 correlated if they move together, but
9 this relationship is causal only if one
10 of the variables causes the movement in
11 the other."

12 Do you see that?

13 A. Yes, I do.

14 Q. You continue, "If instead
15 there is a third factor that causes both
16 to move together, the correlation is not
17 causal."

18 Do you see that?

19 A. Yes, I do.

20 Q. Do you agree that there is a
21 difference between correlation and
22 causation?

23 A. Yes, I do. That's what we
24 just covered.

1 Q. You agree that correlation
2 does not equal causation, correct?

3 A. That's -- once again, that's
4 what we just -- yeah, that's what's in
5 the paragraph.

6 Q. And next to the paragraph in
7 the margin you have two highlighted
8 terms. First you have "correlated" and
9 you write, "Two economic values are
10 correlated if they move together."

11 And causal, "Two economic
12 variables are causally related if the
13 movement of one causes movement of the
14 other."

15 Do you see that?

16 A. Yes, I do.

17 Q. And that basically repeats
18 what you have in the substance of the
19 paragraph, correct?

20 A. That's correct.

21 Q. And you agree that the
22 distinction between correlation and
23 causality is an important distinction,
24 correct?

1 A. Yes, I do.

2 Q. In fact, that's the title of
3 Section 3.1 of your book, "The important
4 distinction between correlation and
5 causality," right?

6 A. Yes.

7 Q. I want to also draw your
8 attention to a cartoon that is included
9 on Page 66 of your book in the lower
10 left-hand corner.

11 Do you see that?

12 A. Yes, I do.

13 Q. Professor Gruber, did you
14 select this cartoon to be included in
15 your book?

16 A. Yes, I did.

17 Q. And the cartoon depicts a
18 man sitting at a desk and another man
19 standing next to the desk, and the
20 caption is, "That's the gist of what I
21 want to say, now get me some statistics
22 to base it on."

23 Do you see that?

24 A. Yes, I do.

1 Q. Why did you include this
2 cartoon in your book?

3 A. I'm trying to -- in my
4 textbook, I'm trying to find ways to get
5 students to understand and remember
6 important empirical concepts. The
7 cartoons are not to be definitional or
8 dispositive. But rather to get them to
9 sort of have some graphical associations
10 with thinking about the important issues
11 in the book.

12 Q. What association do you want
13 the students to take away from this
14 particular cartoon?

15 A. From this cartoon I want
16 them to take away the distinction that
17 just having data about something does not
18 imply causation.

19 Q. And similarly, correlation
20 does not equal causation, correct?

21 MR. KO: Objection. Asked
22 and answered.

23 THE WITNESS: That's
24 correct.

1 BY MR. GEISE:

2 Q. I want to direct your
3 attention to the next page of your book.
4 You see there's a heading, "The Problem"?

5 A. Yes, I do.

6 Q. You write in the first
7 sentence, "In all of these examples, the
8 analysis suffered from a common problem:
9 The attempt to interpret a correlation as
10 a causal relationship without sufficient
11 thought to the underlying process
12 generating the data."

13 Do you see that?

14 A. Yes, I do.

15 Q. And do you agree that
16 correlation should not be interpreted as
17 a causal relationship without analysis of
18 the underlying process generating the
19 data?

20 A. Yes, I do.

21 Q. If you look at the last
22 sentence of that paragraph on Page 67,
23 you write, "Once the data are available
24 on any two measures, it is easy to see

1 whether or not they move together, a
2 characteristic we call being correlated."

3 Do you see that?

4 A. Yes, I do.

5 Q. You continue, "What is
6 harder to assess is whether the movements
7 in one measure are causing the movements
8 in the other."

9 Do you see that?

10 A. Yes, I do.

11 Q. And then you continue, "For
12 any correlation between two variables, A
13 and B, there are three possible
14 explanations, one or more of which could
15 result in the correlation: A causes B, B
16 causes A, some third factor causes both."

17 Do you agree with that?

18 A. Yes, that's what I wrote.

19 Q. And on the next page you
20 also wrote in the first sentence of the
21 last paragraph, in Section 3.1, "The
22 general problem that empirical economists
23 face in trying to use existing data to
24 assess the causal influence of one factor

1 on another, is that one cannot
2 immediately go from correlation to
3 causation. This is a problem for policy
4 purposes because what matters most is
5 causation. Policymakers typically want
6 to use the results of empirical studies
7 as a basis for predicting how government
8 interventions will affect behaviors.

9 Knowing that two factors are correlated
10 provides no predictive power; prediction
11 requires understanding the causal links
12 between the factors."

13 Do you see that?

14 A. Yes, I do.

15 Q. Now, in the context of your
16 book, are you using the term "factors" to
17 mean the same as a variable?

18 A. That would be another word
19 for typically what's used in economic
20 studies.

21 Q. You are familiar with the
22 term "dependent variable"?

23 A. Yes, I am.

24 Q. How would you define that

1 I gave previously.

2 THE WITNESS: I once again
3 would just say broadly we
4 discussed how we were going to
5 measure these things.

6 BY MR. GEISE:

7 Q. Were you requested for
8 purposes of your analysis to use
9 shipments as a proxy for consumption?

10 A. No.

11 Q. I'm going to ask you to turn
12 to Paragraph 72 in your expert report.
13 You see this is the first paragraph in
14 Roman Numeral IV, entitled "Impact of
15 Shipments on Opioid Dependence."

16 Do you see that?

17 A. Yes, I do.

18 Q. And directing your attention
19 to the first sentence in that paragraph,
20 you write, "In this section and the next,
21 I show that the increases in shipments of
22 prescription opioids was a direct and
23 substantial cause of the rapid growth in
24 mortality for both licit and illicit

1 opioid-related mortality in the past
2 20 years."

3 Do you see that?

4 A. Yes, I do.

5 Q. Now, for purposes of your
6 analysis, are shipments your independent
7 variable?

8 A. Yes. Okay. Well, let me
9 clarify that answer. Shipments are one
10 of the set of independent variables that
11 we look at.

12 Q. What other independent
13 variables did you look at for part of
14 your analysis?

15 A. Well, as you can see later
16 in the report, I looked at measures of
17 demographics in the county, measures of
18 economic activity, and measures of
19 non-opioid mortality.

20 Q. We'll talk about those other
21 variables in a moment. But are there any
22 other variables in addition to the
23 demographics, economics activity, and
24 non-opioid mortality that you looked at?

1 A. I don't think so.

2 Q. Specifically with respect to
3 your opinion in Paragraph 72 that there
4 is a direct and substantial -- that
5 shipments of prescription opioids was a
6 direct and substantial cause of the rapid
7 growth in mortality for both licit and
8 illicit opioid-related mortality, are you
9 attributing responsibility for increases
10 in shipments to conduct by any of the
11 individual entities in this lawsuit?

12 MR. KO: Object to the form.

13 THE WITNESS: I'm
14 attributing this to the
15 consequence of the behavior of a
16 variety of entities who are
17 defendants in this lawsuit.

18 BY MR. GEISE:

19 Q. But you have not attributed
20 responsibility to a specific defendant in
21 this lawsuit, correct?

22 A. That is correct.

23 MR. KO: Object -- object to
24 the form. Objection, asked and

1 answered.

2 BY MR. GEISE:

3 Q. Your opinion in Paragraph 72
4 is based on shipments in the aggregate;
5 is that correct?

6 MR. KO: Objection. Asked
7 and answered.

8 THE WITNESS: That is
9 correct.

10 MR. KO: Actually I
11 apologize to you. I didn't see
12 that you asked about Paragraph 72.

13 BY MR. GEISE:

14 Q. Professor Gruber, if a
15 defendant in this case was dismissed,
16 would your opinion set forth in
17 Paragraph 72 change at all?

18 A. I haven't really focused on
19 that. I don't know.

20 Q. So the removal of a
21 defendant or a group of defendants from
22 this case would not impact your opinion
23 in Paragraph 72; is that correct?

24 MR. KO: Object to the form.

1 THE WITNESS: I didn't say
2 that. I said I don't know.

3 BY MR. GEISE:

4 Q. Well, can you tell me if you
5 have an opinion with respect to a
6 specific defendant as it relates to your
7 opinion in Paragraph 72?

8 A. As we discussed, my opinion
9 in Paragraph 72 is about the relationship
10 between aggregate shipments and outcomes.

11 I've not formed any
12 opinions -- opinions with respect to a
13 specific defendant.

14 Q. So, I think we established
15 before that you don't know if there are
16 other entities who contributed to
17 shipments that aren't part of this
18 lawsuit, correct?

19 MR. KO: Object to the form.

20 THE WITNESS: I -- can
21 you -- can you ask again? I don't
22 quite understand.

23 BY MR. GEISE:

24 Q. Sure. You don't -- you're

1 looking at shipments in the aggregate,
2 correct?

3 A. That's correct.

4 Q. You do not know if the
5 defendants in this lawsuit are
6 responsible for that full aggregate of
7 shipments, correct?

8 A. That's correct.

9 Q. So if a defendant were not
10 in the case, current defendant is
11 dismissed, say, would that change the
12 opinion, or is your opinion still based
13 on the aggregate regardless of the
14 underlying individual defendants?

15 MR. KO: Object to the form.

16 THE WITNESS: I just, I
17 haven't really worked that out. I
18 don't know.

19 BY MR. GEISE:

20 Q. And if you haven't worked it
21 out, you couldn't answer questions about
22 that today, correct?

23 MR. KO: Object to the form.

24 THE WITNESS: That's

1 correct.

2 BY MR. GEISE:

3 Q. Continuing in Paragraph 72,
4 you write, "The relationship between the
5 rapid rise in prescription opioid
6 shipments and the increase in
7 opioid-related mortality since the mid
8 1990s is readily apparent when comparing
9 differences across geographic areas and
10 opioid shipments received between 1997 to
11 2010 and the growth of opioid dependence
12 and mortality."

13 Do you see that?

14 A. Yes, I do.

15 Q. And then you continue by
16 saying your discussion here identifies
17 and illustrates these major trends,
18 right?

19 A. That's what it says, yes.

20 Q. Now, according to the layout
21 in your textbook that we looked at
22 earlier, a correlation between increasing
23 opioid shipments and increasing opioid
24 mortality could have three possible

1 Q. Looking at Paragraph 78 of
2 your report, in your first sentence, you
3 wrote, "As these data imply, there are
4 wide differences across counties and the
5 growth of per capita shipments over time.
6 This is demonstrated further in Figure
7 1.16 below which compares high shipment
8 to low shipment areas."

9 Do you see that?

10 A. Yes, I do.

11 Q. And you used the comparison
12 for high shipment to low shipment
13 counties for several of your graphs and
14 analysis in your report, correct?

15 A. That's correct.

16 Q. Is it true that Cuyahoga
17 County is not in the group of counties in
18 the top 25 percent of shipments?

19 A. I believe that's true, yes.

20 Q. And is it also true that
21 Summit County is not in the group of
22 counties in the top 25 percent of
23 shipments, correct?

24 A. I believe that's true, yes.

1 Q. And is it true that Cuyahoga
2 County is not in the bottom 25 percent of
3 counties?

4 A. That's correct.

5 Q. And same for Summit County?

6 A. That's correct.

7 MR. KO: Just so the record
8 is clear, Steve, I assume that the
9 top 25 and bottom 25 percent that
10 you're referring to is as
11 Dr. Gruber describes it in his
12 report.

13 MR. GEISE: Correct. His
14 chart for bottom 25 percent of
15 shipments and top 25 percent of
16 shipments.

17 BY MR. GEISE:

18 Q. So you agree that in your
19 charts and figures that use the
20 demarcation of top 25 percent and bottom
21 25 percent that Cuyahoga and Summit
22 County actually are not part of those
23 families of the top and bottom quartile?

24 MR. KO: Object to the form.

1 THE WITNESS: The -- the
2 data that's included here, the --
3 so if we look at Figure 1.16, the
4 orange and blue lines do not
5 include Cuyahoga and Summit.

6 The reason that the -- these
7 figures are constructed is to
8 demonstrate for the -- as a
9 general tendency in the data, the
10 relationship -- the -- the fact
11 that shipments grew much faster in
12 some areas of the country than in
13 others.

14 BY MR. GEISE:

15 Q. Did you perform the analysis
16 and create a chart for the second
17 quartile of counties that are in that
18 second 25 percent of shipments?

19 A. No, I did not.

20 MR. KO: Object to the form.

21 BY MR. GEISE:

22 Q. Did you perform the analysis
23 for the counties in the third quartile?

24 A. As I describe in the report,

1 there -- since shipments is, as they
2 described, only a proxy for opioid use,
3 we decided the clearest way to make the
4 comparison was to show the very high
5 shipment and the very low shipment
6 places.

7 If you want to look at a --
8 at an analysis that's county by county,
9 that's what Professor Cutler's regression
10 analysis does. This is to show clearly
11 and transparently the relationship
12 between places that were high shipment
13 and low shipment places and the resulting
14 outcomes.

15 Q. Do you agree that your
16 depiction of the difference between high
17 shipment and low shipment outcomes does
18 not specifically apply to Cuyahoga and
19 Summit Counties?

20 MR. KO: Object to the form.

21 Mischaracterizes.

22 THE WITNESS: No, I don't
23 agree with that.

24 BY MR. GEISE:

1 Q. Okay. Do you agree that
2 Cuyahoga and Summit Counties would not be
3 included in the red line on Figure 1.16
4 for the top 25 percent shipments?

5 A. Yes, I agree.

6 Q. And you agree that they
7 would not be included in the blue line at
8 Figure 1.16 for the bottom 25 percent of
9 shipments?

10 A. Yes, I agree.

11 Q. Their category is not
12 depicted in this figure, correct?

13 A. That's correct.

14 Q. If I could ask you to look
15 at Section B of your report that begins
16 on Page 55 and covers Paragraphs 79, 80
17 and 81, and direct your attention to the
18 last sentence in Paragraph 79 where you
19 write, "Nonetheless, data are available
20 that can be used to compare OUD" -- which
21 is opioid use disorder?

22 A. Correct.

23 Q. -- "as measured from NSDUH
24 data in states with higher and lower

1 levels of prescription opioid shipments."

2 Do you see that?

3 A. Yes.

4 Q. And NSDUH is the National
5 Survey on Drug Use and Health, correct?

6 A. I don't recall the exact
7 title of the survey. I've used the
8 acronym so many times. I don't
9 believe it's -- I don't know if it's
10 health or households. I know what -- I
11 don't know what the last H stands for.

12 Q. Okay. Let me ask you.

13 In Section B of your report
14 that begins on Page 55, are you analyzing
15 any relationship between shipments as the
16 independent variable and opioid use
17 disorder as the dependent variable?

18 A. Ask the question again, I'm
19 sorry.

20 Q. Yeah. In Section B, it's --
21 it's titled, "Self-Reported OUD is higher
22 in areas with greater shipments."

23 Do you see that heading?

24 A. Yeah.

1 Q. But I'm asking, did you
2 analyze any relationship between
3 shipments as the independent variable and
4 opioid use disorder as the dependent
5 variable?

6 MR. KO: In this report as a
7 whole or in this specific
8 paragraph?

9 MR. GEISE: In the report as
10 a whole.

11 THE WITNESS: In this report
12 as a whole, once again what we're
13 doing here is, this is
14 illustrating in a clear and
15 transparent way that when you
16 divide the independent variable
17 into high and low shipment areas,
18 that there is a significant
19 difference in the value of the
20 dependent variable. And that's
21 what I'm trying to illustrate in
22 this Figure 1.17.

23 BY MR. GEISE:

24 Q. What you're illustrating in

¹ Figure 1.17, is that more accurately
² described as a correlation as opposed to
³ causation?

4 MR. KO: Object to the form.

12 BY MR. GEISE:

13 Q. And while it's consistent
14 with your hypothesis, contained within
15 your report or the appendix, is not a
16 data analysis to prove a relationship
17 between the two, correct?

18 MR. KO: Object to the form.

19 THE WITNESS: That is
20 correct.

21 BY MR. GEISE:

22 Q. Looking again at
23 Paragraph 79 of your report. In the --
24 the second sentence, you say, "As

1 isn't?

2 A. No, I've not.

3 Q. If we turn to Page 57 of
4 your report in Section C, it is entitled
5 "Opioid-Related Mortality Grew Faster in
6 Areas That Received More Shipments."

7 Do you see that?

8 A. Yes, I do.

9 Q. In the last sentence of
10 Paragraph 82, you provide, "In
11 particular, I ask whether areas that
12 received more shipments of prescription
13 opioids have higher rates of growth of
14 opioid mortality."

15 Do you see that?

16 A. Yes.

17 Q. So here the independent
18 variables are shipments; is that right?
19 Is that one of them?

20 A. I'm not estimating
21 regression model here.

22 Q. Okay. All right. So with
23 regard to your analysis of a potential
24 relationship between shipments and opioid

1 mortality, did you perform a regression
2 analysis to explore that?

3 A. In this report, I did not.
4 This uses the kind of illustrative graphs
5 and regression analysis as contained in
6 Professor Cutler's report.

7 Q. Do you rely on the
8 information contained in Professor
9 Cutler -- Professor Cutler's report for
10 your analysis and conclusions in this
11 section of your report?

12 A. I do not rely on that, no.

13 Q. You don't rely on Professor
14 Cutler?

15 A. In -- I've used Professor
16 Cutler's report in -- I understand
17 Professor Cutler's report. It influenced
18 in the construction of my report. But in
19 the conclusions I draw here, I do not
20 rely on his regression estimates.

21 Q. Why not?

22 A. Because he has the report.

23 So this -- we decided, as a team, to use
24 my report, this introductory report, to

1 clearly and transparently illustrate the
2 causal relationship at hand. But not to
3 delve into the magnitudes that come out
4 of -- that Professor Cutler produces that
5 then feed into Professor McGuire's
6 report.

7 Q. And as you've used the term
8 a couple times in answers, through your
9 figures in that, is that what you refer
10 to illustrating the causal relationship?

11 MR. KO: Object to the form.

12 THE WITNESS: I, as I've
13 talked -- as you mentioned, in my
14 textbook, I think graphic
15 illustration is a very transparent
16 and clear way to illustrate a
17 relationship. And that's what I'm
18 doing here.

19 BY MR. GEISE:

20 Q. But graphic illustrations
21 may also just be demonstrating
22 correlation, not causation, correct?

23 A. That's possible, yes.

24 MR. GEISE: I see it's about

1 quarter to 1:00. We've been going
2 for about another hour. Why don't
3 we take our break for lunch now.

4 THE WITNESS: Sure.

5 MR. KO: Okay.

6 THE VIDEOGRAPHER: The time
7 is 12:44 p.m., and we're off the
8 record.

9 - - -

10 (Lunch break.)

11 - - -

12 THE VIDEOGRAPHER: The time
13 is 1:30 p.m. We are on the
14 record.

15 BY MR. GEISE:

16 Q. Professor Gruber, throughout
17 your report, when you talk about
18 shipments, what is your definition of a
19 shipment?

20 A. It's what it says. It's --
21 it's -- the ARCOS collects data on the
22 amount of each prescription drug. In
23 this case, prescription opioids, that are
24 shipped to -- shipped to distribution

1 points in a given county or they measure
2 a final level, we aggregate it up to
3 county.

4 Q. When you say distribution
5 points, how do you define that?

6 A. I don't know the precise
7 definition, but it's the places that, to
8 which individuals can go to get their
9 opioids. So pharmacies and things of
10 that nature.

11 Q. It would be dispensing
12 locations?

13 A. Dispensing locations would
14 be a better way to put it.

15 Q. And did you conduct analysis
16 of that ARCOS data yourself to determine
17 the shipment numbers or did you rely on
18 Compass?

19 A. As I said before, as is my
20 usual practice in this kind of analysis,
21 when I have very talented research
22 assistants, they handle the data and
23 handle my requests for that information.

24 Q. The ARCOS data that you

1 relied on for the definition of
2 shipments, is that again aggregate for
3 that area, for -- for a county?

4 MR. KO: Object to the form.

5 THE WITNESS: Yeah. Can you
6 try -- try that one again.

7 BY MR. GEISE:

8 Q. Well, sure. It sounds to me
9 like you looked at the ARCOS data for
10 particular opioids and not necessarily
11 opioids from a particular source. Is
12 that fair?

13 MR. KO: Object to the form.

14 THE WITNESS: I don't know
15 what you mean by source.

16 BY MR. GEISE:

17 Q. Okay. You didn't look for
18 the amount of shipments associated with a
19 particular manufacturer.

20 A. That was not the point or
21 purpose of the analysis, no.

22 Q. Nor did you look for the
23 particular amount of shipments from a
24 distributor?

1 A. Once again, we're looking
2 at -- at more aggregated levels of
3 shipments.

4 Q. And -- and that's fine. But
5 by looking at the aggregate level, you
6 didn't look at a particular shipment from
7 a particular manufacturer or distributor?

8 A. I wasn't asked to do that,
9 no.

10 Q. Looking at Paragraph 83 of
11 your report, you write -- and I'll just
12 read the -- the first sentence -- "While
13 this approach identifies substantial
14 differences in opioid mortality rates in
15 areas that received higher and lower
16 levels of shipments, it comes with an
17 important challenge: Comparing shipments
18 across areas does not account for the
19 critical transshipment problem that marks
20 the distribution of prescription opioids
21 in the 2000s."

22 Do you see that?

23 A. Yes.

24 Q. Can you please tell me your

1 definition of transshipment?

2 A. Transshipment would mean
3 opioids that were prescribed to
4 individuals at a given -- in a given
5 location or dispensed into this given
6 location, but were not used by those
7 individuals, instead were transported to
8 be used by individuals in other
9 locations.

10 Q. So consumption of the opioid
11 could take place in a location different
12 than the shipment of the opioid?

13 A. That is correct.

14 Q. So where you used shipments
15 as a proxy for consumption, that proxy
16 would not work in the situation of a
17 transshipment?

18 MR. KO: Object to the form.

19 THE WITNESS: I don't know
20 why it would not work.

21 BY MR. GEISE:

22 Q. Well, if you're using
23 shipments as a proxy for consumption, are
24 you doing that in a particular area or a

¹ particular county?

2 A. Well, as I described, within
3 each county we are proxying for use of
4 opioids with the shipments to that
5 county.

6 Q. And if the consumption of an
7 opioid, say, in Cuyahoga County is
8 actually an opioid that was shipped to a
9 different county, then shipments would
10 not be a proxy for consumption in that
11 situation, correct?

12 A. No, that's not correct.

13 Q. Why?

14 A. Because the word proxy --
15 shipments would not be a perfect --
16 perfect non-error -- yes, the word proxy
17 means a proxy. It is our -- it is
18 basically our attempt to measure, using
19 available data as well as possible the
20 amount of opioids in the county.

21 Q. So that is a -- a situation
22 where shipments cannot be a perfect match
23 for consumption in a particular county?

24 MR. KO: Object to the form.

1 THE WITNESS: They may or
2 may not be.

3 BY MR. GEISE:

4 Q. You would agree that in a
5 situation of transshipment, that the
6 consumption does not occur in the same
7 county as the shipment?

8 A. That's the definition of
9 what we mean by transshipment.

10 Q. How did you account for
11 transshipments in determining shipments
12 in a particular county?

13 A. So, in determining shipments
14 to a particular county, we simply
15 measured shipments to that county.
16 Transshipment was accounted -- is
17 clearly a factor that happens,
18 particularly from -- from Florida to
19 places like Cuyahoga and Summit. And
20 that is a reason why it's useful to do
21 the kind of more aggregated analysis that
22 I do in this report to compare very high
23 shipment to very low shipment areas as a
24 factor.

1 Q. In Paragraph 83 of your
2 report, in the last two sentences, you
3 write, with respect to transshipment,
4 "This will induce some measurement error
5 into my comparisons, reducing the power
6 of shipments to distinguish high versus
7 low use areas. To some extent, I address
8 this measurement error by comparing only
9 the highest and lowest shipment areas in
10 the large county sample discussed above."

11 Do you see that?

12 A. Yes, I do.

13 Q. How does comparing only the
14 highest and lowest shipment areas correct
15 for the measurement error that is
16 introduced by the transshipment problem?

17 A. It corrects it because we
18 think that as long as places that have
19 more shipment have more consumption,
20 which then basically -- let me -- let me
21 restart.

22 If there is measurement
23 error in a variable, then comparing two
24 values that are very close to each other

1 may be harder to distinguish than two
2 variables that are much farther apart
3 from each other. So two variables that
4 are very farther apart from each other,
5 we clearly think there's a distinction
6 that places that have high shipments,
7 then at the highest shipments clearly
8 have the highest consumption and places
9 with lower shipments clearly have lowest
10 consumption. Whether two places that
11 have shipments which are one different
12 from each other have different
13 consumption, is unclear.

14 Q. When you account for this by
15 comparing only the highest and lowest
16 shipment areas, do you agree that that
17 analysis then doesn't necessarily apply
18 to the two areas in the middle, the
19 middle two quartiles?

20 MR. KO: Object to the form.

21 THE WITNESS: The analysis
22 here is our best attempt to
23 represent the central tendency in
24 the data.

1 BY MR. GEISE:

2 Q. But what you're comparing is
3 only the highest and lowest shipment
4 areas, correct?

5 A. And as -- as I'm -- as I'm
6 doing, as I explained, the reason I'm
7 doing that is to try to create a format
8 which can illustrate clearly the causal
9 relationship between shipments and harms.
10 And that we think is the best way to do
11 it.

12 Q. What results would you find
13 if you compared the second and third
14 quartiles as opposed to the highest and
15 lowest shipment areas with regard to
16 addressing the measurement error?

17 A. I don't know for sure. But
18 the -- once again, as I described with
19 measurement error, if there's some
20 measurement error, then obviously the
21 more you really distinguish clear groups,
22 like the top and the bottom, the -- the
23 stronger your conclusions can be.

24 Q. A moment ago in one of your

1 answers, you said that there is -- there
2 is higher consumption in areas with
3 higher shipments. Did I hear that
4 correctly?

5 A. Yes, yes.

6 Q. Is that a causal
7 relationship?

8 MR. KO: Object to the form.

9 THE WITNESS: I mean they
10 are basically shipments -- yes,
11 it's a causal relationship, yeah,
12 that's right.

13 BY MR. GEISE:

14 Q. You said that you used
15 shipments as a proxy for consumption.
16 But by that answer you're telling me that
17 consumption is caused by the shipments.

18 A. That's a good point.

19 MR. KO: Is there a
20 question?

21 MR. GEISE: Yes.

22 THE WITNESS: I guess in
23 this -- the way -- the reason I'm
24 using shipments is as a proxy for

1 consumption.

2 I'm not using them because
3 of a particular causal
4 relationship. I'm using them
5 because they are the best
6 available proxy we have for
7 consumption at the county level,
8 and we wanted to carry out this
9 analysis at the county level.

10 BY MR. GEISE:

11 Q. Did you have any discussions
12 with Compass Lexecon to see if there were
13 other ways to measure consumption at a
14 county level?

15 A. Yes.

16 Q. What ways did you consider?

17 A. I don't recall.

18 Q. Did Compass Lexecon report
19 to you about different potential ways to
20 measure consumption at a county level?

21 A. All I recall is we discussed
22 it at various times.

23 Q. So sitting here today, you
24 recall a discussion about other ways to

1 A. I don't remember.

2 Q. Do you know what four
3 counties those were?

4 A. I've seen the list, but I
5 can't recall it offhand.

6 Q. Do you know what state they
7 were in?

8 A. I don't recall.

9 Q. Do you know either from your
10 own work or from any study, the
11 percentage of people who received a
12 prescription for a medically necessary
13 condition for prescription opioid and
14 later became addicted to heroin?

15 MR. KO: Object to the form.

16 THE WITNESS: That was a
17 long question. Can you either say
18 it again or break it down?

19 BY MR. HALLER:

20 Q. Do you know either from your
21 own work or from any study the percentage
22 of people who had a prescription opioid
23 for a legitimate medical need and later
24 became addicted to heroin?

1 MR. KO: Object to the form.
2 THE WITNESS: I don't know
3 that number offhand, although
4 studies we've looked at during
5 today have made reference to
6 computations like that, of that
7 nature, which suggest that a very
8 small minority of people who get
9 prescriptions then transition onto
10 heroin.

11 BY MR. HALLER:

12 Q. But you don't know what that
13 percentage is? Do you believe it to be a
14 single-digit percentage?

15 A. I don't recall the way that
16 you phrased it. One of the studies -- we
17 can look back at it, in a particular way
18 they phrased it, they had a number of 1
19 percent. But I don't recall what that
20 was 1 percent of.

Q. To talk a little bit about your Gateway hypothesis, do you know the demographic that's most likely to be prescribed a prescription opioid?

1 MR. KO: Object to the form.

2 THE WITNESS: I used
3 shipment -- I used -- I have
4 different analyses in the report.
5 So I think you'll have to talk
6 about which particular figure
7 you're referring to or analysis.

8 BY MR. HALLER:

9 Q. Let's -- I want to refer you
10 to Page 59 of your report.

11 A. Okay.

12 Q. With regard to and figure
13 1.18, what shipment data are you using?

14 A. There we are splitting into
15 counties by whether they have a high or
16 low level of shipments of prescription
17 opioids over the 1999 to 2010 period on
18 average.

19 Q. Is there a name for the
20 analysis that you're doing here that's
21 reflected in this figure where you
22 have -- you're comparing the highest
23 quartile shipments with the lowest
24 quartile shipments? What do you call

1 that analysis?

2 A. I would call it a way to use
3 the data to sort of transparently
4 illustrate the causal relationship
5 between shipments and mortality.

6 Q. Let me -- for the work that
7 Professor Cutler did, I know that's
8 called a multivariate regression
9 analysis. And I can go into lots and
10 lots of textbooks, and they can talk to
11 me about that, right.

12 But if I want to look for a
13 textbook that discusses -- that discusses
14 the analysis that you're doing on this
15 page, this type of analysis, what do I
16 look for in the index? What's this
17 called?

18 MR. KO: Object to the form.

19 THE WITNESS: I would not
20 say this has a particular
21 methodological name. You would
22 see, if you looked at many, I
23 might say most, modern empirical
24 economic analyses, they will

1 typically include, in addition to
2 multivariate regression analysis,
3 increasingly they're including
4 graphical illustrations of the
5 data so that the reader can -- the
6 reader who is not -- the reader
7 can transparently understand
8 what's going on in the data,
9 rather than to rely on the
10 statistical interpretation.

11 So we typically, you know,
12 so we encourage our students today
13 when they're writing a paper to
14 include both figures that
15 transparently illustrate the story
16 they are trying to tell, as well
17 as using underlying statistical
18 analysis to make that more
19 concrete.

20 BY MR. HALLER:

21 Q. And I'm not focused so much
22 on the graphic itself as the analysis
23 that underlines -- underlies the graphic,
24 where you've divided -- you take the

1 lowest quartile and the highest quartile,
2 and you've shown a difference in terms of
3 mortality, growth between those two
4 quartiles. What's the name of that
5 analysis so I can find it in a textbook?

6 MR. KO: Objection. Asked
7 and answered.

24 BY MR. HALLER:

1 Q. But what you're showing
2 graphically here is not Professor
3 Cutler's regression, it's something else,
4 right?

5 MR. KO: Objection. Asked
6 and answered.

7 THE WITNESS: This is --
8 this is using the same data
9 Professor Cutler does, the exact
10 same dataset, to show clearly for
11 the reader who wants to go beyond
12 the statistical analysis to
13 actually visualize the data and
14 say, is there a clear indication
15 in the data of what's happening.

16 This is -- I would say this
17 is a compliment using the same
18 data that Professor Cutler does,
19 it's identical dataset.

20 BY MR. HALLER:

21 Q. If we were -- if we were
22 graphing Professor Cutler's work, we'd
23 have some sort of a line running through
24 400 different dots, right, showing them

1 BY MR. HALLER:

2 Q. Can I refer you to Page 43
3 please, in your report.

4 A. Okay.

5 Q. So that page includes
6 Figure 1.10, which reflects, does it not,
7 that for the most part, shipments into
8 Summit were above the national average
9 for this time period, whereas shipments
10 into Cuyahoga were below the national
11 average; is that right?

12 A. Yes, that's correct.

13 Q. Did you do any investigation
14 into why shipments were, per capita, were
15 significantly lower in Cuyahoga than they
16 were in Summit?

17 MR. KO: Object to the form.

18 THE WITNESS: Not that I can
19 recall.

20 BY MR. HALLER:

21 Q. If we turn the page to
22 Figure 1.11, we can see opioid mortality
23 rates in Summit and Cuyahoga in relation
24 to the national average. And at least

1 through 2010 or 2011, the mortality rates
2 in both counties stayed pretty close to
3 the national average; is that right?

4 A. That's correct.

5 Q. Now, if -- if shipments, in
6 your view, drive opioid mortality, how is
7 it that the two counties end up with
8 about the same opioid mortality but there
9 are significantly big differences in the
10 shipments to those two counties?

11 MR. KO: Object to the form.

12 THE WITNESS: Can you
13 express that in terms of the
14 graphs? I don't quite understand
15 what -- what conclusion you're
16 drawing.

17 BY MR. HALLER:

18 Q. Well, on page -- on Page 43,
19 in Figure 1.10 we can see that the
20 shipments into Summit were much higher
21 than the shipments into Cuyahoga, right?

22 A. Yes.

23 Q. But the mortality, as
24 reflected on Figure 1.11, is roughly the

1 same as between the two counties. And I
2 would have thought if shipments, in fact,
3 are driving mortality, that the higher
4 shipments in Summit would have led to
5 higher mortality, but instead, the higher
6 shipments resulted in about the same
7 mortality. So I'm -- I'm asking if you
8 can square that for me.

9 MR. KO: Object to the form.

10 THE WITNESS: Sure. So two
11 answers. One is about the same
12 until 2014 when -- when Summit
13 does get higher.

14 And the second answer is, as
15 I said before, we're trying to use
16 these data to explain the central
17 tendencies that both, as I say, if
18 you do a sort of transparent
19 graphical analysis or regression
20 analysis, there's a clear
21 relationship between shipments in
22 2010 and opioid mortality.

23 That does not mean that that
24 relationship -- that does not mean

1 you cannot find an observation of
2 data or two for which that
3 relationship doesn't appear to
4 hold. You can take any empirical
5 analysis and find a pair of
6 observations where the
7 relationship estimated for the
8 central tendency of the data
9 doesn't hold for that pair of
10 observations.

11 BY MR. HALLER:

12 Q. And here the pair of
13 observations is Cuyahoga and Summit,
14 right?

15 A. That's correct.

16 Q. Now, you've testified -- and
17 I think your report reflects this view,
18 that these various factors that you say
19 happened in or around 2010, in reality
20 those factors didn't all occur in 2010 at
21 a particular point in time; is that
22 right?

23 MR. KO: Object to the form.

24 THE WITNESS: That's

1

CERTIFICATE

3

4

5 I HEREBY CERTIFY that the
witness was duly sworn by me and that the
6 deposition is a true record of the
testimony given by the witness.

7

8 It was requested before
completion of the deposition that the
witness, JONATHAN GRUBER, Ph.D., have
9 the opportunity to read and sign the
deposition transcript.

10

11

12

Michele L. Gray

MICHELLE L. GRAY,
A Registered Professional
Reporter, Certified Shorthand
Reporter, Certified Realtime
Reporter and Notary Public

15

Dated: April 30, 2019

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(The foregoing certification
of this transcript does not apply to any
reproduction of the same by any means,
unless under the direct control and/or
supervision of the certifying reporter.)

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INSTRUCTIONS TO WITNESS

2

3 Please read your deposition
4 over carefully and make any necessary
5 corrections. You should state the reason
6 in the appropriate space on the errata
7 sheet for any corrections that are made.

8

After doing so, please sign
the errata sheet and date it.

10

You are signing same subject
to the changes you have noted on the
errata sheet, which will be attached to
your deposition.

14

It is imperative that you
return the original errata sheet to the
deposing attorney within thirty (30) days
of receipt of the deposition transcript
by you. If you fail to do so, the
deposition transcript may be deemed to be
accurate and may be used in court.

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4 PAGE LINE CHANGE

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6 REASON: _____

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2 ACKNOWLEDGMENT OF DEPONENT

3

4 I, _____, do
5 hereby certify that I have read the
6 foregoing pages, 1 - 496, and that the
7 same is a correct transcription of the
8 answers given by me to the questions
9 therein propounded, except for the
10 corrections or changes in form or
11 substance, if any, noted in the attached
12 Errata Sheet.

13

14

15

16 JONATHAN GRUBER, Ph.D. DATE

17

18

19 Subscribed and sworn
to before me this

20 ____ day of _____, 20 ____.

21 My commission expires: _____

22

23 _____
Notary Public

24

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LAWYER'S NOTES

2 PAGE LINE

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